

WHAT IS CLAIMED IS:

1. A trimeric unsymmetrical polyurethane polyol comprising the reaction product of:

- a) a diisocyanate;
- b) an aliphatic diol having 1-6 carbon atoms; and
- c) a polymeric diol having at least one oxycarbonyl linkage and having from 5-20 carbon atoms.

2. A polyurethane polyol as in claim 1, wherein the diisocyanate is selected from 2,2,4-trimethylhexamethylene diisocyanate, 1,6-hexamethylene diisocyanate, 1,1'-methylene-bis-(4-isocyanatocyclohexane), 4,4'-methylene-bis-(cyclohexyl diisocyanate), hydrogenated toluene diisocyanate, 4,4'-isopropylidene-bis-(cyclohexyl isocyanate), 1,4-cyclohexyl diisocyanate, 4,4'-dicyclohexyldiisocyanate, and 3-isocyanato methyl-3,5,5-trimethylcyclohexyl diisocyanate, and mixtures and combinations thereof.

3. A polyurethane polyol as in claim 1, wherein the diisocyanate is aliphatic.

4. A polyurethane polyol as in claim 1, wherein the aliphatic diol is selected from the group consisting of 1,2-propanediol, ethyl-1,3-hexanediol, 1,6-hexanediol, 2-methyl propanediol, and 1,5-pentanediol, and mixtures and combinations thereof.

5. A polyurethane polyol as in claim 1, wherein the aliphatic diol includes an odd number of carbon atoms.

6. A polyurethane polyol as in claim 1, wherein the polymeric diol is selected from polycarbonate diols and polycaprolactone diols, and mixtures thereof.

7. A polyurethane polyol as in claim 1, wherein the diisocyanate is 2,2,4-trimethylhexamethylene diisocyanate, wherein the aliphatic diol is 1,5-pentanediol, and wherein the polymeric diol is polyoxohexylene carbonate diol.

8. A polyurethane polyol as in claim 1, wherein the ratio of the diisocyanate:aliphatic diol:polymeric diol is from 1:1.9:0.1 to 1:1.1:0.9

9. A polyurethane polyol as in claim 1, wherein the reaction product comprises a low viscosity, non-crystalline substantially 100 percent solids material.

10. A coating composition comprising the reaction product of:  
a) a polyurethane polyol precursor comprising the reaction product of:

- i) a diisocyanate;
- ii) an aliphatic diol having 1-6 carbon atoms; and
- iii) a polymeric diol having at least one oxycarbonyl linkage and having from 5-20 carbon atoms; and

b) a polyisocyanate.

11. A coating composition as in claim 10, wherein the polyisocyanate is selected from 2,4,6-trioxo-1,3,5-tris(6-isocyanatohexyl)hexahydro-1,3,5-triazine, N-isocyanatohexylaminocarbonyl-N,N'-bis(isocyanatohexyl)urea, the biuret of hexanediisocyanate, polymeric methane diisocyanate, and polymeric isophorone diisocyanate.

12. A coating composition as in claim 10, wherein the composition further comprises a catalyst for promoting reaction of the polyurethane polyol precursor with the polyisocyanate.

13. A coating composition as in claim 10, wherein the catalyst is selected from dibutyltin dilaurate, dibutyltin

diacetate, stannous octoate, butyl stannous acid, and bismuth carboxylate.

14. A coating composition as in claim 10, wherein the composition further comprises one or more additives selected from the group consisting of antioxidants, colorants, UV absorbers, light stabilizers, and surfactants.

15. A coating composition as in claim 10, wherein the diisocyanate of the polyurethane polyol precursor is selected from 2,2,4-trimethylhexamethylene diisocyanate, 1,6-hexamethylene diisocyanate, 1,1'-methylene-bis-(4-isocyanatocyclohexane), 4,4'-methylene-bis-(cyclohexyl diisocyanate), hydrogenated toluene diisocyanate, 4,4'-isopropylidene-bis-(cyclohexyl isocyanate), 1,4-cyclohexyl diisocyanate, 4,4'-dicyclohexyldiisocyanate, and 3-isocyanato methyl-3,5,5-trimethylcyclohexyl diisocyanate, and mixtures and combinations thereof.

16. A coating composition as in claim 10, wherein the aliphatic diol is selected from 1,2-propanediol, ethyl-1,3-hexanediol, 1,6-hexanediol, 2-methyl propanediol, and 1,5-pentanediol, and mixtures and combinations thereof.

17. A coating composition as in claim 10, wherein the polymeric diol is selected from polycarbonate diols and polycaprolactone diols, and mixtures thereof.

18. A coating composition as in claim 10, wherein the polyurethane polyol precursor comprises the reaction product of 2,2,4-trimethylhexamethylene diisocyanate, 1,5-pentanediol, and polyoxohexylene carbonate diol.

19. A coating composition as in claim 18, wherein the polyurethane polyol precursor is further reacted with 2,4,6-trioxo-1,3,5-tris(6-isocyanatohexyl)hexahydro-1,3,5-triazine in the presence of dibutyltin dilaurate as a catalyst.

20. A substrate having a coating on at least one surface thereof, said coating comprising the reaction product of:

a) a polyurethane polyol precursor comprising the reaction product of:

- i) a diisocyanate;
- ii) an aliphatic diol having 1-6 carbon atoms; and
- iii) a polymeric diol having at least one oxycarbonyl linkage and having from 5-20 carbon atoms; and

b) a polyisocyanate.

21. A substrate as in claim 20, wherein the substrate is glass.

22. A substrate as in claim 20, wherein the substrate comprises a polymeric material.

23. A substrate as in claim 22, wherein the substrate comprises a polycarbonate sheet.